G. S. Faulkner,

Steam Slide Valve.

No. 37,545. Patented Jan. 27, 1863.

Fig. 5.

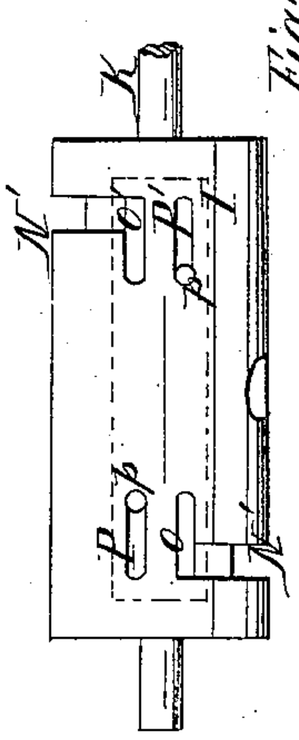


Fig. 6.

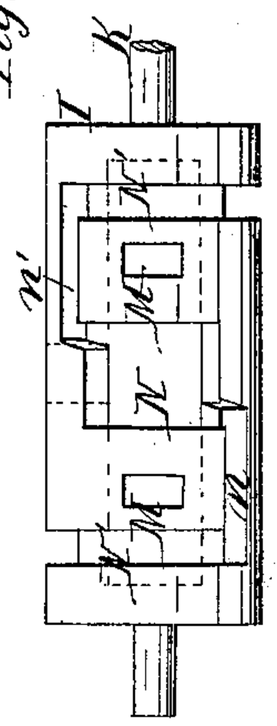


Fig. 2.

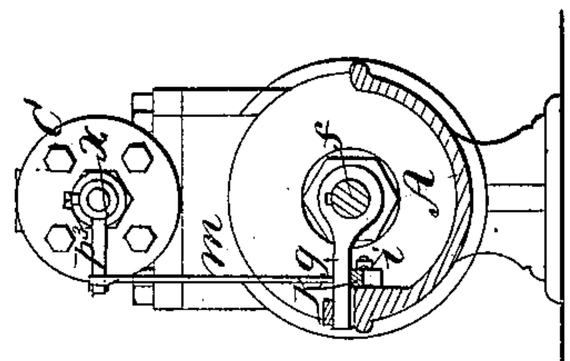


Fig. 4.

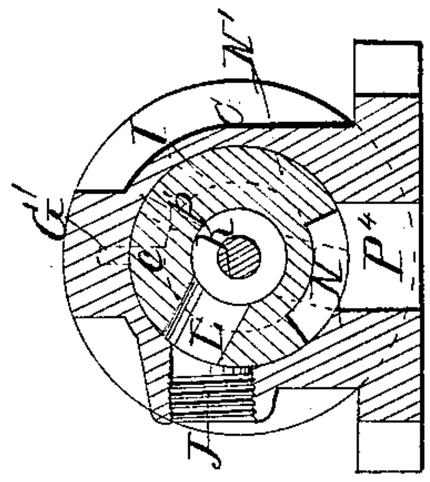


Fig. 3.

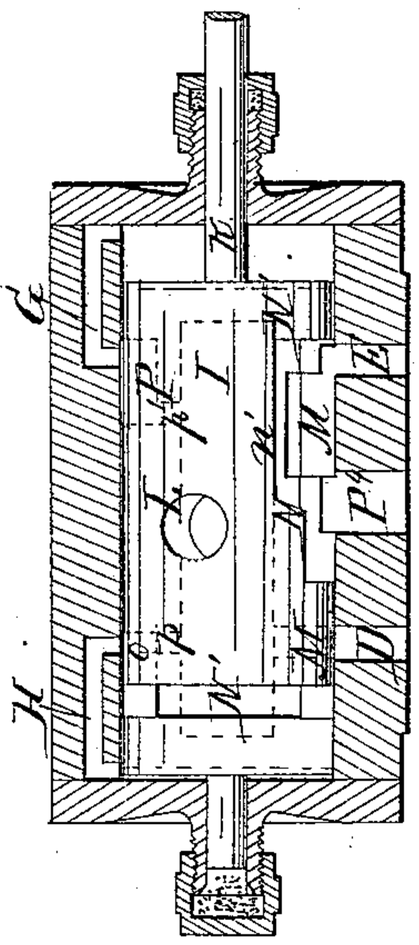
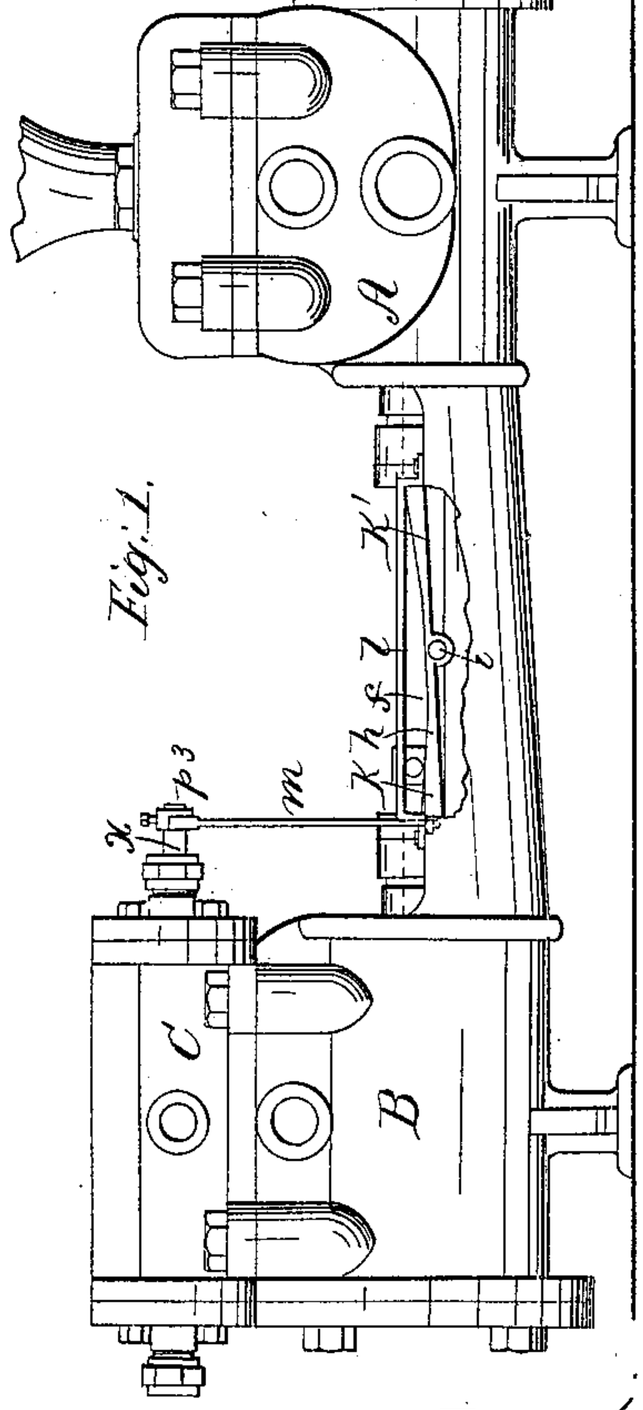


Fig. 1.



Witnesses;
B. F. Colton
Milton Bradley

Inventor,
George S Faulkner

UNITED STATES PATENT OFFICE.

GEORGE S. FAULKNER, OF STAFFORD, CONNECTICUT, ASSIGNOR TO O. T. EARLE, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN STEAM-VALVES.

Specification forming part of Letters Patent No. **37,545**, dated January 27, 1863.

To all whom it may concern:

Be it known that I, GEORGE S. FAULKNER, of Stafford, in the county of Tolland and State of Connecticut, have invented certain new and useful Improvements in Steam-Valves of Reciprocating Motors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an outside view of a pump with my invention attached, showing the method of communicating motion from the piston-rod to the valve. Fig. 2 is a cross section, taken between the steam and water cylinders, showing an end view of steam-engine cylinder and the valve chest. Fig. 3 is a longitudinal section of the valve-chest with the valve in it. Fig. 4 is a cross-section of the valve-chest and valve. Fig. 5 is a top view, and Fig. 6 a bottom view, of the valve.

Similar letters of reference in the several figures indicate corresponding parts.

The distinctive property of my valve is the capability of its being moved longitudinally by the direct action of the steam upon it, while it depends upon intermediate mechanical devices only for the necessary circular motion which it makes in supplying and exhausting the steam, such mechanical devices being acted upon indirectly by the steam.

My invention relates to the valves of a steam-cylinder for producing merely a reciprocating motion—that is, when the power produced by the movement of the steam-piston can be advantageously used without converting it into rotary motion by means of a crank or other device, and as the direct-acting steam-pump is the most common example of such a motion, I have represented my valve as so applied in the drawings accompanying these specifications.

In a direct-acting pump—namely, one in which the steam-piston and pump-piston are attached to the opposite ends of the same piston-rod, it is desirable to provide the steam-cylinder with such a valve that it shall not be necessary to introduce a fly-wheel and shaft to assist in the operation of the valve—namely, in common terms, to carry it past the dead-points, and also such a valve that, notwithstanding the steam is shut off at any point in the motion of the piston, the steam-valve will be so situated that on "letting on" the steam it will immediately operate to start the pump without any from other sources. Such a valve I have contrived in so simple a manner that the whole is comprised in one piece of cast-iron, placed in a circular steam-chest having suitable induction and exhaust ports, and the operation of the same during several months of practical experiment with it has been very successful.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A is the water-cylinder of the pump. B is the steam-engine cylinder, and C the steam-chest thereof. The steam-chest is simply another cylinder of smaller diameter than B, bored straight through, and having on its lower side the induction-ports D E and the exhaust-port P, as in an ordinary steam-cylinder valve-seat. In its upper side are two ports, G H, through which steam, escaping from the hollow valve I, passes to move the said valve back or forward in a longitudinal direction.

The valve I just mentioned, and the only valve employed, consists of a hollow cylinder with two heads, and a rod, K, passing through it with extensions beyond the heads, as shown. The surface of the valve being provided with various ports, which connect with the interior of the valve, and also work in conjunction with the ports of the chest and the steam-cylinder.

The ports and their uses I will now describe.

L is the main receiving-port and opening directly into the interior chamber of the valve I, and so situated as always to be wholly or partially opposite the opening J in the chest C, through which the steam passes from the steam-pipe of the generator. M M are two ports passing entirely through the shell of the valve I, connecting the interior with the exterior, and through which steam passes into the ports D E, and thence into the engine-cylinder. N is the main or body part of the exhaust-port, being a recess in the exterior of the shell of the valve I, but not cutting entirely through to the interior chamber. *n n'* are branches of the port N, passing around the induction-ports on opposite sides, and thence around the valve-shell in directions perpendicular to its axis and opposite to each

other, to the top of the valve-shell, and terminating with a short return branch, as at *o o'*, each one falling a little short of coming to the top of the valve-shell—namely, to a line exactly opposite the center line through the ports M M N. P P' are two ports equally distant the other side of this top center line and of the same length as the return branches *o o'*. At the inside end of each of these ports a communication, *p p*, is made with the interior of the valve.

Now, the operation is as follows: The valve being in the position seen in Figs. 3 and 4—namely, the steam passing into the left-hand end of the engine cylinder through the port D—the port *o* is in communication with the port H in the top of the steam-chest, this port having served as an exhaust-port for the steam at the left of the valve I when it moved to its present position. Now, by a slight rotation of the valve on its axis, the port *o* is moved from under the port H, and the port P comes into connection with it and live steam from the interior of the valve passes through the port H and forces the valve I to the other end of the chest, which it is free to do as by the rotation, which admitted the steam to this end, the exhaust-port G was brought into connection with the port P'. Now, as the valve is thrown to the other end of the chest the port D comes into connection with the branch *n* of the exhaust-port N, and this end is free to exhaust and the port *n'* comes into connection with the port E, and the right-hand end of the cylinder commences to take steam.

Thus by this peculiar combination of ports in the hollow cylindrical valve I, this one valve is enabled to accomplish the object desired with the addition of two ports, G H, in the inner circumference of the steam-chest and two extra passages, P P' *p p*, in the hollow valve, and without any extra slide-valves or mechanical devices for sliding the one valve I. The steam passes directly into the interior chamber of the valve I, and then either escapes through the ports leading to the piston of the engine-cylinder, or through the ports leading into the ends of the steam-chest, but not through both at the same time. The quantity of steam used for moving the valve longitudinally is exceedingly slight, compared with the quantity passed into the engine-cylinder for moving the piston.

The valve I has its bearings on the extension ends of the rod passing through its axis, said ends playing in brass boxes. Thus the valve is relieved of much friction on its surface.

I will now describe my method of operating the valve to give it the circular motion necessary to bring its ports into proper relation to the ports of the chest and engine-cylinder.

f is the piston-rod. *g* is an arm projecting horizontally from said rod. *h* is a lever pivoted at the center *i*, and having an inclined plane, *k k'*, at each end. *l* is a guide, arranged over the top of the arm *g* to keep it down in place. *m* is a rod connecting the end of lever *h* to the arm p^3 on the end X of the rod K of the valve I. Now, as the piston-rod moves from right to left, the arm operates on the inclined plane *k* to depress one end of the lever *h*, and thus to turn the valve I, and when it moves back in the opposite direction the valve receives a corresponding turn, but in a converse direction.

What I claim, and desire to secure by Letters Patent, is—

1. The hollow cylindrical valve I, having the several ports arranged and combined, and operating substantially in the manner and for the purpose described.

2. A steam-chest constructed with the ports D E P^4 and G H, and with a straight cylindric bore, in combination with a hollow cylindric valve with the ports described, and fitted into said chest so that a steam-joint practically is formed substantially as set forth.

GEORGE S. FAULKNER.

Witnesses:
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MILTON BRADLEY.